

REMARKS / ARGUMENTS

A. General

In the Office Action, the Examiner has requested the Applicant's co-operation in order to correct any possible minor errors in the specification, given the length of the specification. The Applicant respectfully submits that, at this time, the Applicant is not aware of any minor errors in the specification, other than those addressed in the previous Response filed on April 18, 2005.

B. Summary of the Amendments

The present application still contains 17 claims.

Claim 16 has been amended to correct a minor typographical error identified by the Applicant.

The Applicant respectfully submits that no new subject matter has been added to the application by way of the present amendment.

C. Rejection of Claims 1-18 under 35 U.S.C. 103

On page 2 of the Office Action, the Examiner has rejected claims 1-17 under 35 U.S.C. 103(a) as being unpatentable over *Chang et al.* U.S. Patent 6,731,631 (hereinafter referred to as Chang) in view of *LeBihan* U.S. Patent 5,189,672 (hereinafter referred to as LeBihan). The Applicant respectfully traverses this rejection and submits that the subject matter of claims 1-17 distinguishes clearly and patentably over the cited prior art, as discussed below.

Claim 1

The Examiner's attention is directed to the following emphasized feature of

independent claim 1:

“said routing layer including a controller to control release of a data packet toward a cell of said array at least in part on a basis of a degree of occupancy of the memory in said cell.”

The Examiner acknowledges that Chang does not expressly disclose the above-identified feature, as argued by the Applicant in the Response filed on April 18, 2005. However, the Examiner now contends that Le Bihan discloses this feature and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Chang to include this feature “as taught by Le Bihan in order to regulate the throughput as closely as possible”. To support his contention, the Examiner refers to col. 2, lines 34-48, col. 3, lines 59-67 and col. 1, lines 42-43 of Le Bihan.

The Applicant respectfully disagrees with this finding by the Examiner and submits that Le Bihan does not disclose, teach or suggest the above-emphasized feature of claim 1. More specifically, none of the passages from Le Bihan cited by the Examiner teach “control[ling] release of a data packet *toward* a cell [...] on a basis of a degree of occupancy of the memory *in said cell*” (italics added by the Applicant for emphasis).

Le Bihan is directed to a device for regulating the throughput of virtual circuits carried by an asynchronous time-division multiplex transmission channel. The Applicant would like to draw the Examiner’s attention to certain specific passages from Le Bihan, which describe the use of “a degree of occupancy” of a buffer memory and that explain the buffer memory itself, as follows:

“[...] each cell being stored in the virtual circuit buffer memory associated with the virtual circuit to which the cell belongs, and the outgoing cells of an output asynchronous time-division multiplexing channel are read from the same virtual circuit buffer memories.”
(see col. 2, lines 38-42)

"[...] throughput dependent data is a measure of the occupancy of the buffer memory of the virtual circuit of the cell in question."
(see col. 3, lines 55-57)

"According to another characteristic of the invention, for a degree of filling at least of the buffer memory of a virtual circuit there is provided a count indicator which is incremented when each cell belonging to this virtual circuit is transmitted if said degree of occupancy is exceeded [...]"
(see col. 3, lines 58-62)

"[...] the buffer occupancy table [...] indicates the number of cells waiting in the virtual circuit buffer memory. The higher this number, the higher the speed of transmission of the cells of the virtual circuit, that is to say the shorter the time interval between them."
(see col. 8, lines 20-25)

Firstly, it should be noted that, in Le Bihan, a "cell" is a digital data structure including a header and a message body, where a continuous stream of message cells is carried by a transmission channel (see col. 1, lines 13-27). In contrast, in the present invention, a "cell" is an entity that performs processing on a data packet (e.g. switching of the data packet), where a switch fabric for establishing signal paths between senders and receivers is formed of a plurality of such cells (see page 10, lines 11-18).

Secondly, notwithstanding this distinction between Le Bihan and the present invention, it is clear from the above-cited passages that Le Bihan teaches regulating throughput on the basis of the occupancy of the buffer memory **from which** the outgoing cells (comparable to "data packets" of the present invention) **are being read**. This is in complete contrast to controlling the release of data packets on the basis of a degree of occupancy of the memory in the cell **to which** the data packets **are being sent**, as claimed in independent claim 1 and of which there is neither mention nor suggestion in Le Bihan.

In short, it is clear that the cited prior art references, whether taken alone or in combination, neither explicitly disclose nor implicitly suggest all of the limitations of independent claim 1. It follows that at least one of the criteria required for

establishing a *prima facie* case of obviousness in accordance with MPEP 706.02(j)¹ has not been satisfied. The Examiner is therefore respectfully requested to withdraw the rejection of claim 1, which is believed to be in condition for allowance.

Claims 2-12

Claims 2-12 are all either directly or indirectly dependent on claim 1 and therefore include all the limitations of claim 1, including the feature already shown to be absent from both Chang and Le Bihan. Thus, for the same reasons as those set forth above in support of claim 1, the Examiner is requested to withdraw the rejection of claims 2-12.

Notwithstanding the foregoing argument, the Applicant would like to make the following comments regarding each of dependent claims 3-7 and 10.

Claim 3 reads as follows (emphasis added):

"A router as defined in claim 2, wherein the memory of said routing layer includes an area for storing data indicative of a **degree of occupancy of the memory of said cell.**"

In response to the Examiner's findings at page 4 of the Office Action regarding claim 3, the Applicant respectfully submits that, at column 16, lines 29-46, Chang discusses storing occupancy information for the cells of the switch matrix 2004 *from which* packets are being read (see in particular col. 16, lines 30-31), where this occupancy information is used by Chang to control the release of packets *from* the memory of switch matrix 2004. This is in contrast to storing occupancy information for the memory of a cell *to which* a data packet is being sent, as claimed in claim 3. Since Le Bihan's throughput regulation also uses the occupancy of the memory *from* which the packets are being read, as opposed to the occupancy of the memory *to which* packets are being sent, the cited prior art references do not

¹ For the Examiner to establish a *prima facie* case of obviousness, three criteria must be considered: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings, (2) there must be a reasonable expectation of success, and (3) the prior art references must teach or suggest all of the claim limitations. MPEP §§ 706.02(j), 2142 (8th ed.).

disclose, teach or suggest the subject matter of dependent claim 3. Accordingly, claim 3 is believed to be novel and non-obvious over the cited prior art and, as such, in condition for allowance.

Claim 4 reads as follows (emphasis added):

"A router as defined in claim 3, wherein said controller is in communication with said memory to **obtain access to the data indicative of a degree of occupancy of the memory of said cell**, said controller controlling release of data packets from the memory of said routing layer **at least in part on a basis of the data indicative of a degree of occupancy of the memory of said cell**."

In response to the Examiner's findings at page 4 of the Office Action regarding claim 4, the Examiner's attention is drawn to the packet memory of Chang's Figure 3, which is used to store data packets prior to their release from the routing layer to the switching layer (see Examiner's own comments regarding claim 2 at page 3 of the Office Action). Chang does not disclose nor suggest that: (1) the controller for this routing layer obtains access to the *degree of occupancy* of the memory of *a cell of the switch matrix 2004*; and (2) the controller *uses that occupancy information to control the release of packets from the routing layer*. Since there is no mention in Le Bihan of a switching layer, the Applicant respectfully submits that the cited prior art references do not disclose, teach or suggest the subject matter of dependent claim 4. Accordingly, claim 4 is believed to be novel and non-obvious over the cited prior art and, as such, in condition for allowance.

Claim 5 reads as follows (emphasis added):

"A router as defined in claim 4, wherein the memory of said routing layer includes **a plurality of areas associated with respective cells of said array**, each area operative to store data indicative of **a degree of occupancy of the memory of a corresponding cell**."

In response to the Examiner's findings at page 4 of the Office Action regarding claim 5, the Applicant respectfully submits that nowhere in Chang is it taught or suggested that the lookup memory (Figure 3) of the routing layer stores information about the *degree of occupancy* of the memory of the *cells of the array of the switching layer*. Since Le Bihan does not even disclose an array of cells, it is

clear that the cited prior art references do not disclose, teach or suggest the subject matter of dependent claim 5. Accordingly, claim 5 is believed to be novel and non-obvious over the cited prior art and, as such, in condition for allowance.

Claim 6 reads as follows (emphasis added):

"A router as defined in claim 5, wherein said controller is **responsive to a control signal issued by said switching layer to alter the data indicative of a degree of occupancy of the memory of a given cell** in the area associated with the given cell."

In response to the Examiner's findings at page 4 of the Office Action regarding claim 6, the Applicant respectfully submits that nowhere in column 15, lines 53-63 or column 16, lines 24-41 of Chang is it taught or suggested that the layer 2/3/4 switching controller is responsive to a control signal *issued by the switching layer* to alter the data indicative of the *degree of occupancy* of the memory of a *given cell*. Since Le Bihan does not even disclose a switching layer with a plurality of cells, it is clear that the cited prior art references do not disclose, teach or suggest the subject matter of dependent claim 6. Accordingly, claim 6 is believed to be novel and non-obvious over the cited prior art and, as such, in condition for allowance.

Claim 7 reads as follows (emphasis added):

"A router as defined in claim 6, wherein **each cell of said switching layer** is operative to issue a control signal to said controller to convey to said controller data indicative of the degree of occupancy of the memory of the cell."

In response to the Examiner's findings at page 5 of the Office Action regarding claim 7, the Applicant respectfully submits that nowhere in Figure 17 or column 14, lines 40-54 of Chang is it taught or suggested that each cell *of the switching layer* is operative to issue a control signal to the *layer 2/3/4 switching controller* to convey to said controller data indicative of the *degree of occupancy* of the memory of *the respective cell*. Since Le Bihan does not even disclose a switching layer with a plurality of cells, it is clear that the cited prior art references do not disclose, teach or suggest the subject matter of dependent claim 7. Accordingly,

claim 7 is believed to be novel and non-obvious over the cited prior art and, as such, in condition for allowance.

Claim 10 reads as follows (emphasis added):

"A router as defined in claim 9, wherein each cell of said array, in response to release of a data packet from a certain slot of the memory of the cell, issues the control signal to convey to said controller data indicative of the degree of occupancy of the memory of the cell."

In response to the Examiner's findings at page 5 of the Office Action regarding claim 10, the Applicant wishes to clarify to the Examiner that the "controller" referred to in claim 10 controls the release of data packets *from the routing layer to the switching layer* (see clause (d) of claim 1 and claims 2, 4, 6-7). Furthermore, when the Applicant refers to "a certain slot of the memory of the cell" in claim 10, the "cell" is part of *the switching layer* (see clause (b) of claim 1). The present application therefore teaches (and claims) that a cell of the switching layer signals a controller in the routing layer to indicate to the controller the degree of occupancy of the memory of that cell.

In contrast, Chang teaches a packet memory (Figure 3) in a routing layer that conveys occupancy information to a controller in *the same* routing layer. Chang also teaches a switching layer in switch matrix 2004 with a free cell manager 2010 that communicates occupancy information to a central controller 2008 and to a queue manager 2012 that are in *the same* switching layer. Since Le Bihan does not even disclose multiple layers, it is clear that the cited prior art references do not disclose, teach or suggest the subject matter of dependent claim 10. Accordingly, claim 10 is believed to be novel and non-obvious over the cited prior art and, as such, in condition for allowance.

Claim 13

The Applicant notes that in both the first Office Action dated November 17, 2004 and the second Office Action dated September 9, 2005, the Examiner has failed to specifically address the limitations of independent claim 13, which differ

from those of independent claim 1. As a result of the differences between claims 1 and 13, the Examiner's comments with regard to the teachings of Chang and Le Bihan are not directly applicable to independent claim 13.

The Examiner's attention is now directed to the following emphasized features of independent claim 13:

"A switch fabric implemented on a chip, comprising:

[...]

d) **each cell including:**

- I) **a memory** for receiving a data packet from said I/O interface; and
- II) **a control signal path for transporting a control signal to a component external to said array of cells, the control signal being indicative of a degree of occupancy of said memory.**"

As argued by the Applicant in the previous Response filed on April 18, 2005, Chang does not disclose the above-identified limitation of each cell having a memory and a control signal path for transporting a control signal to a component *external to* the array of cells, the control signal being indicative of a *degree of occupancy* of the memory. Furthermore, Le Bihan does not disclose, teach or suggest this limitation.

In light of the foregoing, the Applicant believes the subject matter of independent claim 13 to be novel and non-obvious over the cited prior art, such that claim 13 is in condition for allowance. Should the Examiner disagree with this conclusion, the Applicant respectfully requests that the rejection of claim 13 be re-stated by the Examiner such as to be directly applicable to the particular limitations of independent claim 13.

Kindly note that, although the Applicant is of the opinion that claim 13 is allowable in its present form, the Applicant would be willing to amend the language of claim 13 to include the following limitation:

"said control signal being used by said component for controlling the release of a data packet toward said cell"

Since the above limitation has already been shown to be absent from the cited prior art (see arguments presented above with respect to independent claim 1), claim 13 as amended would also clearly be in condition for allowance. The Examiner is invited to consider this proposed amendment to independent claim 13 when re-visiting his rejection of claim 13 and to advise the Applicant if such an amendment is considered by the Examiner to be necessary for allowance of the claim.

Claims 14-16

Claims 14-16 are all either directly or indirectly dependent on claim 13 and therefore include all the limitations of claim 13, including the feature already shown to be absent from both Chang and Le Bihan. Thus, for the same reasons as those set forth above in support of claim 13, the Examiner is requested to withdraw the rejection of claims 14-16.

Notwithstanding the foregoing argument, the Applicant would like to make the following comments regarding each of dependent claims 15 and 16.

Claim 15 reads as follows (emphasis added):

"A switch fabric as defined in claim 14, wherein **the control signal indicative of a degree of occupancy of said memory** contains information indicating whether **a slot of said memory is free to accept a data packet.**"

In response to the Examiner's findings at page 5 of the Office Action regarding claim 15, the Applicant respectfully submits that nowhere in Figure 17 or column 14, lines 40-54 of Chang is it taught or suggested that each cell *of the switch fabric* is operative to issue a control signal to a component *external to the array of cells*, the control signal containing information *indicating whether a slot of the memory of the respective cell is free to accept a data packet*. Since there is not even a mention in Le Bihan of a switch fabric including an array of cells, it is clear that the cited prior art references do not disclose, teach or suggest the subject

matter of dependent claim 15. Accordingly, claim 15 is believed to be novel and non-obvious over the cited prior art and, as such, in condition for allowance.

Claim 16 reads as follows (emphasis added):

"A switch fabric as defined in claim 15, wherein in response to release of a data packet from a certain slot of said memory, said cell generating the control signal, the control signal including information identifying the certain slot."

In response to the Examiner's findings at page 5 of the Office Action regarding claim 16, the Applicant would like to clarify to the Examiner that the control signal generated by the cell and including information identifying the certain slot of the memory of that cell from which a data packet was released is sent to a component *external* to the array of cells (see clause (d)(II) of claim 13). In contrast, Chang teaches free cell manager 2010 sending occupancy information to a central controller 2008 and to a queue manager 2012 that are within *the same cell* of the array of cells. Since there is not even a mention in Le Bihan of a switch fabric including an array of cells, it is clear that the cited prior art references do not disclose, teach or suggest the subject matter of dependent claim 16. Accordingly, claim 16 is believed to be novel and non-obvious over the cited prior art and, as such, in condition for allowance.

Claim 17

The Examiner's attention is directed to the following emphasized features of independent claim 17:

"A router, comprising:
[...]

- c) **said routing layer including a controller, said controller responsive to reception of a control signal containing information indicating that said switching layer is capable of accepting a data packet, to release a data packet to said switching layer;**
- d) **wherein said switching layer includes a memory, the control signal containing information indicating the degree of occupancy of said memory."**

As set forth by the Applicant in the previous Response filed on April 18, 2005, Chang does not disclose the above-identified limitations of claim 17. More specifically, Chang does not disclose nor suggest a routing layer including a controller responsive to reception of a control signal containing information indicating that the *switching layer* is capable of accepting a data packet, to release a data packet *to said switching layer*. Moreover, Chang fails to disclose that the control signal contains information indicating the *degree of occupancy of a memory included in the switching layer*.

At page 6 of the latest Office Action, the Examiner acknowledges that Chang does not expressly disclose that "the switching layer includes a memory, the control signal containing information indicating the degree of occupancy of [the] memory." However, the Examiner now contends that Le Bihan discloses this feature and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Chang to include this feature "as that taught by Le Bihan in order to regulate the throughput as closely as possible".

The Applicant respectfully disagrees with this finding by the Examiner and submits that Le Bihan does not disclose, teach or suggest the above-emphasized features of claim 17. Rather, Le Bihan is directed to a virtual circuit controller and makes no mention or suggestion of the concept of a switching layer (with or without memory) or of the concept of a control signal indicative of a degree of occupancy traversing from a switching layer to a controller in a routing layer, where the controller releases data packets to the switching layer on a basis of this control signal.

Furthermore, as argued above with regard to claim 1, in Le Bihan throughput regulation is responsive to the occupancy of the memory that cells are being *read from*, as opposed to the occupancy of a memory in the layer *to which* cells are being *sent*.

The Applicant therefore respectfully submits that the cited prior art references, whether taken alone or in combination, neither explicitly disclose nor implicitly suggest all of the limitations of independent claim 17. As such, claim 17 is believed to be in condition for allowance and the Examiner is respectfully requested to withdraw the rejection of claim 17.

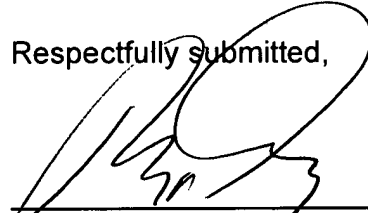
CONCLUSION

In view of the foregoing, Applicant is of the view that claims 1-17 are in allowable form. Favourable reconsideration is requested. Early allowance of the Application is earnestly solicited.

If the application is not considered to be in full condition for allowance, for any reason, the Applicant respectfully requests the constructive assistance and suggestions of the Examiner in drafting one or more acceptable claims pursuant to MPEP 707.07(j) or in making constructive suggestions pursuant to MPEP 706.03 so that the application can be placed in allowable condition as soon as possible and without the need for further proceedings.

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Respectfully submitted,



Ralph A. Dowell
Attorney for Applicant
Reg. No. 26,868

DOWELL & DOWELL, P.C.
2111 Eisenhower Avenue
Suite 406
Alexandria, VA 22314
U.S.A.
Telephone: (703) 415-2555
Fax : (703) 415-2559